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NOTES ON THE FOOD HABITS OF CALIFORNIA SEA-LIONS.

(*Zalophus californianus* Lesson.)

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Read before the Academy, at Topeka, December 31, 1902.

THE following observations on the food habits of sea-lions were made during the months of June, July, August, and September, 1899. The region visited was that of Monterey bay, California, and the coast south of the bay for a distance of about twenty-five miles. Point Pinos marks the southern point of entrance between Monterey bay and the Pacific ocean. Within a radius of two or three miles of this point most of the salmon fishing is done by the Monterey fishermen.

No. 1. June 25. Found old sea-lion cow dead on beach near Point Pinos. Examined the stomach and found that it was full of the flesh of small squids. Beaks, arms and the so-called pens of the squids were common in the half-digested and half-decayed mass.

No. 2. June 27. Found a dead sea-lion cow (bullet hole in her head) about one-half mile south of Point Pinos. Stomach full of squids, many of them in good state of preservation.

No. 3. June 27. This animal was found within a few rods of No. 2. It was a two- or three-year-old bull. It had been dead for some time, as the hair was slipping. Stomach was full of the chewed-up arms of an octopus or devil-fish.

No. 4. June 30. About two miles south of Point Pinos found carcass of old bull sea-lion which had been washed upon the shore in a mass of seaweeds. That part of the muzzle containing the whiskers had been cut away. The penis bone had also been cut out. I was told by fishermen that Chinamen valued these articles, and that they would pay about five dollars for the whisker bristles of an old bull and the same price for the penis bone. This animal had been dead some time. There was a bullet-hole in its skull. Dissection showed that its stomach was gorged with the flesh of a "giant squid," as the large squids (weighing from twenty to forty pounds) of that coast are called. There were pieces of flesh taken from the stomach as large as my hand.

No. 5. July 7. Found sea-lion cow at Point Pinos. Had been washed ashore during the night. The only material found in the stomach was a few parts of squid beaks and a bunch half as large as one's fist of the pens from the backs of squids.

No. 6. July 9. Found a sea-lion cow dead on the beach near "seal

rocks," about three miles south of Point Pinos. Stomach was well filled with the chewed-up parts of a giant squid.

Nos. 7 and 8. July 16. Found two sea-lion cows about a mile south of Point Pinos. Both had been feeding on giant squids. The stomach of one contained about two quarts, that of the other about a gallon, of the chewed-up flesh and arms of giant squids.

The above animals were all found within three miles of Point Pinos. They had been killed, as I was informed by the fishermen, because they were killing and feeding upon the fish, mostly salmon, that were, at this time of the year, coming into the bay. When the weather was favorable, it was not an uncommon thing to see from twenty-five to seventy-five salmon fishermen in small sailboats trolling for salmon.

These animals were killed at the place during the time of the year when the salmon was being taken by fishermen. Yet there was not a fish scale or bone detected in the stomach of any one of them.

On the 20th of July I established a camp about twelve miles south of Monterey bay, between Point Carmel and the lighthouse. About a mile from shore there were two rocky islands. From 100 to 300 sea-lions could be seen on these rocks almost any day. I learned afterwards that they were all cows and calves—not a bull was seen there during my stay of about a month.

Between July 20 and August 16 I killed twelve sea-lions. They were yearlings, two-year-olds, and old cows. The skins and skulls of these animals were saved for museum specimens. Their stomachs were examined and the contents carefully noted. Seven out of the twelve had their stomachs well filled with the flesh of the giant squids. One had gorged itself with an octopus. The other four had empty stomachs, except some remains of the pens and beaks of squids, the quantity varying from a half pint to perhaps a quart.

During this time three animals—all cows—were found dead on the shore. Dissection showed that all had been eating squids.

I found the carcass of an old bull which had been killed, so a ranchman informed me, early, at least not later than the middle of June. This went to show that the bulls were in that locality at that time. The whiskers and penis bone had been taken. I took the skull and examined the decaying stomach, which was full of giant squid meat.

I examined but one more animal, and that was an old cow. She was thrown up on the beach near the seal rocks, about three miles south of Point Pinos. This animal had just been killed, as the skin was in such good condition that it was saved for a specimen. The stomach was gorged with the flesh from an octopus.

The salmon fishermen who were present when the stomachs of the sea-lions were opened up were very much surprised when they saw

that the animals had been feeding upon squids. Some of them said it was because salmon had become scarce and that the sea-lions were compelled to eat squids. These same fishermen told me that from ten to twenty-five years ago there were a great many salmon, but that now the salmon were very scarce and hard to catch. They said that the sea-lions had either destroyed them or "run them out of the country."

When asked if there were not many more sea-lions ten to twenty-five years ago than at present, they admitted that there were. One old fisherman said that twenty-five years ago there were "sea-lions everywhere on all the rocks."

I was informed by the ranchmen and by fishermen that there were no fish within two or three miles of the sea-lion rocks near my camp; the lions had either caught or driven them away. However, I succeeded in catching a dozen rock-cod between shore and the seal rocks. Afterwards, my boatman, George Carr, an old salmon fisherman, caught plenty of rock-cod weighing from one to eight pounds each within sixty feet of the flat rock where from 100 to 300 sea-lions landed every day. He was very much surprised that he could catch so many fish in such a place. Around these rocks, where the sea-lions had lived for ages, proved to be the best fishing-grounds we could find in that locality. The fish could not have been annoyed very much by the sea-lions or they would not have remained there.

My boatman landed me a number of times on the rocky islands. In places the rocks were covered over and partially concealed by the droppings from the animals. In some depressions the manure was a foot deep. I looked for fish bones and scales, but not a single one was discovered. Parts of the pens from the backs of squids were very common in the excrement.

The salmon fishermen told me that they sometimes caught salmon that had pieces bit out of them by sea-lions. They showed me one such specimen. The cut was a smooth one, such as might have been made by a shark, but not a rugged tear, such as the large teeth of the sea-lion would make.

Whenever the sea-lions came into the bay during the salmon-fishing season the fishermen would say that they were after the salmon. They saw them diving in the waters where the salmon were, but there was no evidence that I could see or that they could produce that would show that the lions were after the salmon.

The squids were in the bay at this season of the year. It is more than likely that the lions were after the squids.

The animals that I found dead had all been shot, as a rule in the head. There is just one point that I am not sure of, and that is in

regard to the identification of the material in some of the animals that had been dead for some time. It was hard to tell in some instances whether the contents of the stomach was squid or octopus, or squid and octopus combined.

The above observations were all made in one locality and during the summer season. It would take a series of observations extending through the entire year and from different localities to give the most satisfactory results. The stomachs of but two male animals were examined. The idea occurred to me that if the animals lived in a locality where there were no squids or devil-fish they might live on a fish diet. However, the observations I made go to show, I think, that where fish and squids are both in the waters the sea-lions prefer the squids.